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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/815,564	03/31/2004	John J. Beatty	884.C18US1	7138

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EXAMINER
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ANDUJAR, LEONARDO

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 12/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/815,564

Applicant(s)

BEATTY ET AL.

Examiner

Leonardo Andújar

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-26 is/are pending in the application.
- 4a) Of the above claim(s) 15-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14, 25 and 26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Acknowledgment***

1. The amendment filed on 09/29/2006 in response to the Office action mailed on 08/02/2006 has been entered. The present Office action is made with all the suggested amendments being fully considered.

### ***Election/Restrictions***

2. Applicant's election without traverse of group I (claims 1-12 and 14) in the reply filed on 05/02/2006 is acknowledged.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 5-12, 14 and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al. (US 6,583,502).
5. Regarding claims 1 and 9, Lee (e.g. fig. 2) shows a die 230 including an active surface; a substrate 180 electrically coupled to and an interposer 210' between the die and the substrate, wherein interposer has a body with a first surface, an opposite second surface, and a fluid channel 226' passing through the body from the first surface to the second surface; and under fill mixture 170 dispensed between the interposer and the substrate using capillary flow. Also the substrate does not include a fluid channel in fluid communication with the fluid channel of the interposer.

6. Regarding claim 2, Lee shows the first surface is adapted to receive the die on the die-receiving portion thereof. Also, the die-receiving portion includes an outline defining a die shadow region in a direction from the first surface to the second surface, wherein the fluid channel lies in the die shadow region.

7. Regarding claim 3, Lee shows that the fluid channel includes a vent hole to facilitate capillary flow to underfill mixture dispensed between the interposer and the substrate.

8. Regarding claim 4, Lee shows that the underfill mixture dispensed between the interposer and the substrate includes, a meniscus formed within the vent hole, and the meniscus substantially prevents the underfill from exiting the surface of the interposer (e.g. fig. 15).

9. Regarding claim 5, Lee shows most aspects of the instant invention including channel 226 disposed outside of the die shadow region 230'. Note that the interposer 210 include a plurality of channels.

10. Regarding claim 6, Lee shows that the fluid channel includes a microchannel thorough where the underfill is dispensed. Note that any channel includes other sections that can be recognized as microchannel. Furthermore, the size of any channel can be expressed in micrometers.

11. Regarding claim 7, Lee shows that at least two fluid channels are formed in the interposer.

12. Regarding claims 8 and 14, Lee (e.g. fig. 2) shows a die 230' including an active surface; a substrate 180 electrically coupled to and an interposer 210' between the die

and the substrate, wherein interposer has a body with a first surface, an opposite second surface, and a fluid channel 226' passing through the body from the first surface to the second surface; wherein the first surface is adapted to receive the die on a die receiving portion thereof, wherein the die receiving portion includes an outline defining a die shadow region in a direction from the first surface to the second surface, wherein there are at least two fluid channels formed in the interposer, wherein the at least two fluid channels in the interposer includes a veto hole 226' within the die shadow region and a microchannel 226' that lies outside of the die shadow region, wherein underfill 170 is dispensed into the microchannel and between the interposer and substrate. Note that shadow region is defined by one chip, therefore any other channel, covered by another chip can be recognized as the microchannel.

13. Regarding claim 10, Lee shows that the fluid channel is substantially centered in the interposer (e.g. fig. 1d).

14. Regarding claim 11, Lee shows that the fluid channel includes a vent hole within a die shadow region to facilitate capillary flow of the underfill mixture dispensed between the interposer and the substrate.

15. Regarding claim 12, Lee shows most aspects of the instant invention including channel 226 disposed outside of the die shadow region 230' wherein the die shadow region extends from an active surface of the die through the interposer to the second surface. Note that the interposer 210' include a plurality of channels.

16. Regarding claim 25, Lee shows that the vent hole facilitates capillary flow of the underfill mixture dispensed between the interposer and the substrate.

***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 4 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (US 6,583,502) in view of Lee et al. (US 6,756,251).

19. Regarding claims 4 and 26, Lee'502 shows that the underfill mixture dispensed between the interposer and the substrate includes but does not show a meniscus formed within the vent hole, and preventing the underfill from exiting the surface of the interposer. However, Lee' 251 (e.g. fig. 15) shows that the underfill mixture dispensed between the interposer and the substrate includes, a meniscus formed within the vent hole wherein the meniscus substantially prevents the underfill from exiting the surface of the interposer (e.g. fig. 15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a meniscus formed within the vent hole disclosed by Lee'502 to prevent the underfill from exiting the surface of the interposer between fabrication steps as suggested by Lee'251.

***Response to Arguments***

20. Applicant's arguments filed on 09/29/2006 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

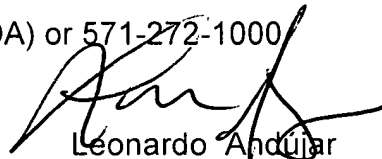
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Leonardo Andujar  
Primary Examiner  
Art Unit 2826

12/05/2006